

REMARKS/ARGUMENTS

STATUS OF CLAIMS

Applicant has amended Claims 28 and 87. Applicant respectfully submits that the specification of the current application supports the amendments to Claims 28 and 87 at paragraphs [0028], [0085], and [0086]. Applicant has cancelled Claims 1-27 and 32-86. Applicant respectfully requests reconsideration of pending Claims 28-31 and 87 in light of the following remarks.

CLAIM REJECTIONS – 35 U.S.C. §102

Independent Claim 28

Claim 28 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Struthers. Claim 28 also stands rejected under 35 U.S.C. § 103(a) as being unpatentable over United States Patent No. 4,767,280 issued to Markuson et al. (hereinafter “Markuson”) in view of Struthers or Struthers in view of Markuson.

Amended Claim 28 specifies “determining whether the AC line current is greater than a programmed threshold causing a jamming fault condition due to a foreign object obstruction in at least one of the pool and the spa; reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the AC line current is less than the programmed threshold in order to drive the motor in a limp mode in an attempt to clear the jamming fault condition and the foreign object obstruction; and shutting down the motor if the motor does not operate within operational limits while being driven in the limp mode and the jamming fault condition and the foreign object obstruction cannot be cleared.”

Struthers teaches a method of operating a variable speed submersible pump 10. Struthers does not teach or suggest that the method can be used in conjunction with a pool or spa, as specified by amended Claim 28.

The pump 10 of Struthers includes a motor 12, a power module 16 including a rectifier 28, a controller 22, a microprocessor 24, an inverter 30, a DC link 32, and sensors 42. The pump 10 uses the sensors 42 to monitor the speed and torque of the motor 12. The sensors 42 monitor the outputs of the inverter 30 which are AC signals. However, the sensors 42 do not measure an AC line current (*i.e.*, AC line 34 current), as specified by amended Claim 28.

Also, Struthers teaches the pump 10 entering a recovery mode when the pump 10 becomes clogged. The controller 22 can only determine that the pump 10 is clogged “by detecting that the motor 12 is developing an unacceptably high torque,” presumably by using torque determinations made by inputs from the sensors 42 monitoring the AC outputs of the inverter 32, but not an AC line current, as specified by amended Claim 28.

In addition, Struthers teaches that the control board 22 may monitor “the minimum, average, and maximum operating current of the motor 12.” The control board 22 monitors this data so that it may be provided to a portable tester plugged into a data port on the pump 10. However, Struthers does not teach using this data to control the operation of the pump 10. *Struthers*, col. 3, lines 1-47; col. 5, lines 18-30; col. 7, line 60 to col. 8, line 2, col. 9, lines 22-47; and Fig. 2.

Markuson does not cure the deficiencies of Struthers. Markuson teaches a controller 10 that monitors power consumption of a pump motor 2 for use in pumping petroleum from beneath the surface of the earth. *Markuson*, Abstract. Markuson does not teach or suggest that the pump motor 2 can be used in conjunction with a pool or spa, as specified by amended Claim 28.

The controller 10 of Markuson provides indications of operating conditions for the pump motor 2. The controller 10 can also measure other conditions, such as flow and temperature. When the controller 10 detects an overload or an underload condition, the controller 10 switches an appropriate indicator light on and starts a timer. Markuson also teaches using the controller 10 to control the operation of the pump motor 2 based on input from a power company demand limit control system. *Markuson*, col. 4, lines 4-7; col. 5, lines 3-11; col. 6, lines 37-41; col. 6, line 59 to col. 7, line 44. In addition, Markuson teaches that service personnel react to the

overload indications before the pump becomes stuck and the motor shuts down. *Markuson*, col. 5, lines 33-53. *Markuson* does not teach or suggest reducing the output voltage to the motor or reducing the operating frequency of the motor when the controller 10 detects an overload or an underload condition. Rather, *Markuson* teaches that a human being must see an indicator light and react before the motor automatically shuts itself down. In addition, *Markuson* does not teach or suggest any method of clearing a jamming fault condition and a foreign object instruction, as specified by amended Claim 28.

Accordingly, neither *Struthers* nor *Markuson* discloses, teaches, or suggests “determining whether the AC line current is greater than a programmed threshold causing a jamming fault condition due to a foreign object obstruction in at least one of the pool and the spa; reducing at least one of an output voltage provided to the motor and an operating frequency of the motor if the AC line current is less than the programmed threshold in order to drive the motor in a limp mode in an attempt to clear the jamming fault condition and the foreign object obstruction; and shutting down the motor if the motor does not operate within operational limits while being driven in the limp mode and the jamming fault condition and the foreign object obstruction cannot be cleared,” as specified by amended Claim 28. Thus, independent Claim 28 and dependent Claims 29-31 are allowable.

Dependent Claims 29-31

Claims 29-31 stand rejected under 35 U.S.C. §102(b) as being anticipated by *Struthers*. Claims 29-31 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Markuson* in view of *Struthers* or *Struthers* in view of *Markuson*. Claims 29-31 depend from independent Claim 28 and are therefore allowable for the reasons set forth above with respect to Claim 28. Claims 29-31 also include additional patentable subject matter not specifically discussed herein.

Independent Claim 87

Claim 87 stands rejected under 35 U.S.C. §102(b) as being anticipated by Struthers. Claim 87 also stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Markuson in view of Struthers or Struthers in view of Markuson.

Amended Claim 87 specifies “determining if the parameter is outside of a range causing a jamming fault condition due to a foreign object obstruction in at least one of the pool and the spa; executing a recovery operation if the parameter is outside of a range in an attempt to clear the jamming fault condition and the foreign object obstruction, the recovery operation including at least one of generating an updated speed control command, driving the motor in a limp mode, shutting down the motor and then restarting the motor, and operating the motor in a reverse direction and then operating the motor in a forward direction; and shutting down the motor if the recovery operation fails and the jamming fault condition and the foreign object obstruction cannot be cleared.”

Struthers teaches a method of operating a variable speed submersible pump 10. Struthers does not teach that the method can be used in conjunction with a pool or spa, as specified by amended Claim 87.

Also, Struthers teaches executing a recovery operation if the pump 10 is “clogged,” which results in shutting down the motor 12 if the recovery operation fails. The controller 22 can only detect a clog only when the motor 12 develops “an unacceptably high torque.” In other words, Struthers only teaches executing a recovery operation when the controller 22 detects an unacceptably high torque. *Struthers*, col. 3, lines 1-13; col. 7, line 60 to col. 8, line 61; Figs. 5A and 5B. Struthers does not teach executing a recovery operation by the controller 22 detecting any one of the parameters specified by amended Claim 87, namely an actual pressure, a bus current, a bus voltage, a line current, a temperature of a heat sink, or a speed of the motor.

Markuson does not cure the deficiencies of Struthers. Markuson teaches a controller 10 that monitors power consumption of a pump motor 2 for use in pumping petroleum from beneath

the surface of the earth. *Markuson*, Abstract. *Markuson* does not teach or suggest that the pump motor 2 can be used in conjunction with a pool or spa, as specified by amended Claim 87.

The controller 10 of *Markuson* provides indications of operating conditions for the pump motor 2. The controller can also measure other conditions, such as flow and temperature. When the controller 10 detects an overload or an underload condition, the controller 10 switches an appropriate indicator light on and starts a timer. *Markuson* also teaches using the controller 10 to control the operation of the pump motor 2 based on input from a power company demand limit control system. *Markuson*, col. 4, lines 4-7; col. 5, lines 3-11; col. 6, lines 37-41; col. 6, line 59 to col. 7, line 44. In addition, *Markuson* teaches that service personnel react to the overload indications before the pump becomes stuck and the motor shuts down. *Markuson*, col. 5, lines 33-53. *Markuson* does not teach or suggest executing a recovery operation when the controller detects an overload or an underload condition. Rather, *Markuson* teaches that a human being must see an indicator light and react before the motor automatically shuts itself down. In addition, *Markuson* does not teach or suggest any method of clearing a jamming fault condition and a foreign object instruction, as specified by amended Claim 87.

Accordingly, neither *Struthers* nor *Markuson* discloses, teaches, or suggests “determining if the parameter is outside of a range causing a jamming fault condition due to a foreign object obstruction in at least one of the pool and the spa; executing a recovery operation if the parameter is outside of a range in an attempt to clear the jamming fault condition and the foreign object obstruction, the recovery operation including at least one of generating an updated speed control command, driving the motor in a limp mode, shutting down the motor and then restarting the motor, and operating the motor in a reverse direction and then operating the motor in a forward direction; and shutting down the motor if the recovery operation fails and the jamming fault condition and the foreign object obstruction cannot be cleared” as specified by amended Claim 87. Thus, independent Claim 87 is allowable.

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CONCLUSION

In view of the above, Applicant respectfully requests entry of the amendment and allowance of pending Claims 20-35 and 87.

Respectfully submitted,

A handwritten signature in cursive script, reading "Raye Lynn Daugherty".

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